

PRELIMINARY REPORT

TROPICAL STORM EDOUARD

13 TO 15 SEPTEMBER 1984

The exact origin of Tropical Storm Edouard is difficult to determine. Disturbed weather had been located over the extreme southwestern Gulf of Mexico and adjacent Mexico for six or seven days prior to the formation of Edouard. The source of this disturbed weather was a frontal trough which weakened over the Gulf of Mexico, but left a large area of showers and thunderstorms over the southwestern Gulf on September 7. For the next three days, this weather diminished and moved slowly westward over Mexico. On September 11, a well organized tropical wave was located in the eastern North Pacific just south of the Bay of Campeche. This wave had moved off the coast of Africa on August 29, over the windward islands on September 4, and across Central America on September 9. The disturbed weather over central Mexico enhanced and moved back to the east as the wave approached, creating a concentrated area of intense showers and thunderstorms over the southwest Gulf of Mexico at this time. This weather persisted through the next few days with portions over land and portions over the Gulf. Air Force reconnaissance aircraft investigating the area on September 13 found that a small tropical depression had formed less than 50 miles from the coast.

Figure 1. shows the track of Edouard. Note that the center of the circulation remained within about 30 miles of latitude 20.3 north and longitude 96.0 west throughout the storm's life time. Furthermore, the center of the storm remained within 50 miles of the coast of Mexico during its entire existence. That is, the storm formed and dissipated near the same location. After its formation, the depression drifted slowly toward the north. However, its northward movement was soon blocked by a surface high pressure area to the north. Steering currents were very weak over the area with south easterly flow near the surface and northwesterly flow aloft for most of September 13 and 14. By September 15, the deep layer flow was from the north but weak. The storm drifted toward the south until it dissipated.

Environmental conditions were never very favorable for storm development. A westerly shear was present over the area for most of the storm's life time. Despite these conditions, a small, short lived, but strong tropical storm formed. The system gained organization and strength from September 13 through the early hours of September 15. Tropical storm strength was attained the morning of September 14 and the minimum pressure and maximum strength of 998 millibars and 55 knot wind speeds were recorded near 0000 GMT September 15. Reconnaissance aircraft reported a small well defined eye at this time. However, this feature was never observed on satellite pictures. This rather rapid strengthening was followed by an even more rapid dissipation. Within 6 hours from the time of the reported 55 knot winds, maxi-

mum wind speeds were less than 30 knots and about 6 hours later, the wind field was so diffuse and confusing, that a center could no longer be identified. Observations at Veracruz, Mexico and satellite imagery indicate that the remnants of Edouard moved inland just south of Veracruz by mid day on September 15. The winds remained from the north northwest to north through out the 15th, reaching a maximum of 30 mph with a gust of 45 mph in heavy rain. Pressures showed little change at Vera Cruz during this period, ranging from a high of 1010.7 mb at 1945 GMT to a low of 1009.8 mb at 2145 GMT and back to 1010.2 mb by 2343 GMT.

Figure 2 depicts the time history of the minimum pressure and maximum wind speeds for Edouard. Note the discrepancy between the satellite estimates of strength and those recorded by the reconnaissance aircraft. Also, note the differences between the wind speeds estimated from the minimum pressure using empirical pressure wind relationships and the observed winds. Furthermore, observations of wind speeds at 5,000 feet (5K) and 10,000 feet (10K) are considerable less than those measured at 1,500 feet (upside down triangles). One possible explanation for these differences is shown in figure 3. This is a plot of the supplementary vortex flight level winds, estimated maximum surface winds, and extrapolated sea level pressures (12 = 1012 mb, etc.) for September 14 from 1405 GMT to 1655 GMT. Note that Edouard was an extremely small storm and that the pressure gradient was confined to an area within about 20 miles of the center. This same structure was observed on later passes through the storm on this day with maximum winds of 55 knots in the south and east portions of the "well defined" eye wall. However, just a few miles from the center, the wind speeds were considerably less. The very small over all size of the storm and the extremely small region of strong winds as well as low environmental pressures may explain why the system did not fit normal empirical relationships (wind/pressure and satellite estimates) and also its rapid demise.

PRELIMINARY BEST TRACK

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DATE/TIME (GMT)	POSITION LATITUDE	LONGITUDE	PRESSURE (MB)	WIND (KT)	STAGE
14/0000	20.3	96.1	1000	30	Tropical
Depression					
0600	20.5	96.2	1000	35	Tropical Storm
1200	20.7	96.1	1000	40	" "
1800	20.5	96.0	1001	45	" "
15/0000	20.3	95.8	998	55	" "
0600	20.0	95.7	1002	25	Tropical
Depression					
1200	20.0	95.7	1001	25	" "
1800					Dissipated

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LATITUDE - DEG. NORTH

21

TUXPAN

+

+

+

20

14/00Z

12

15/00Z

15/12Z

MEXICO

..... TROP. DEPRESSION

- - - TROP. STORM

19

VERACRUZ

+

+

+

98

97

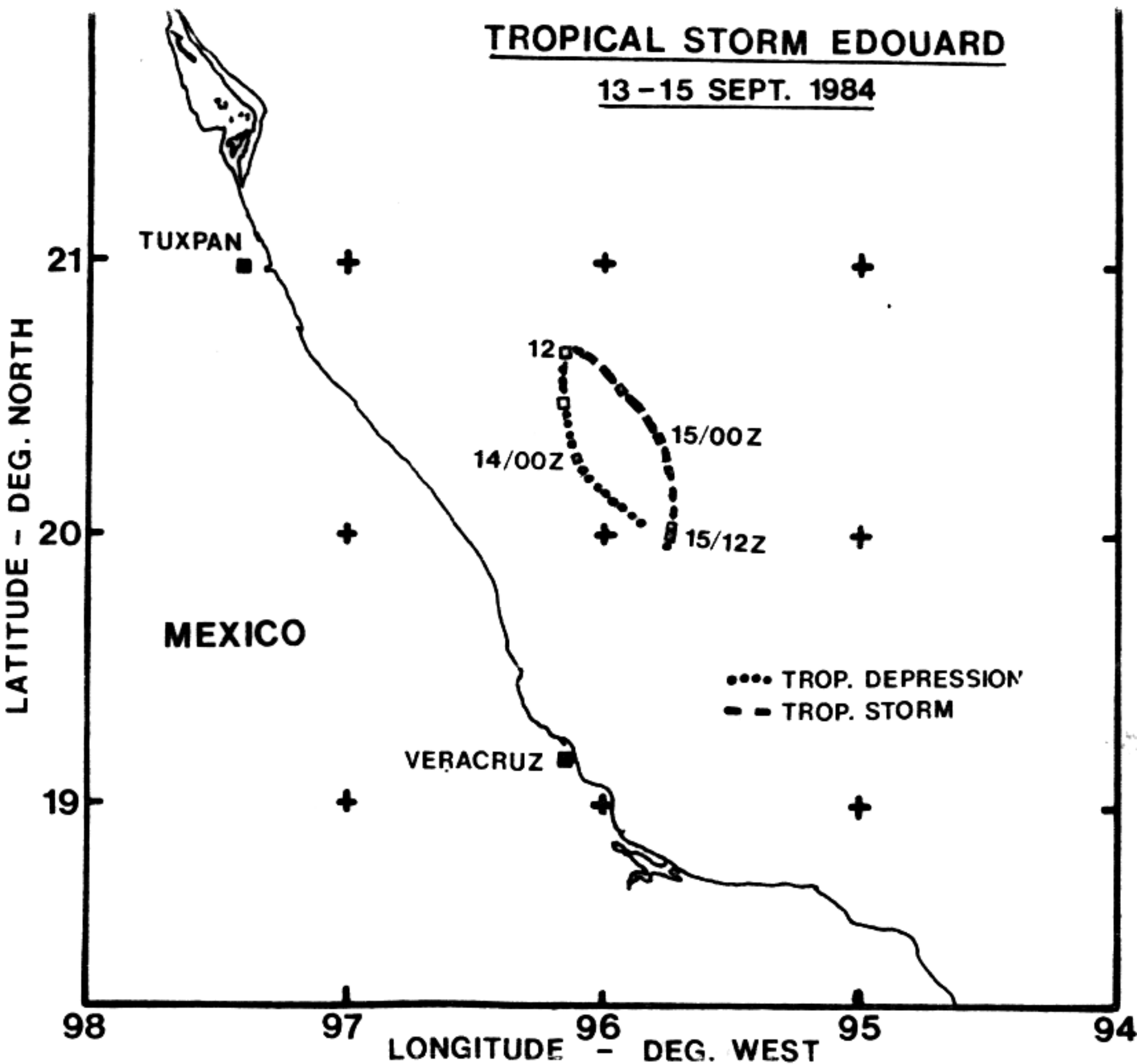
LONGITUDE - DEG. WEST

96

95

94

FIGURE 1



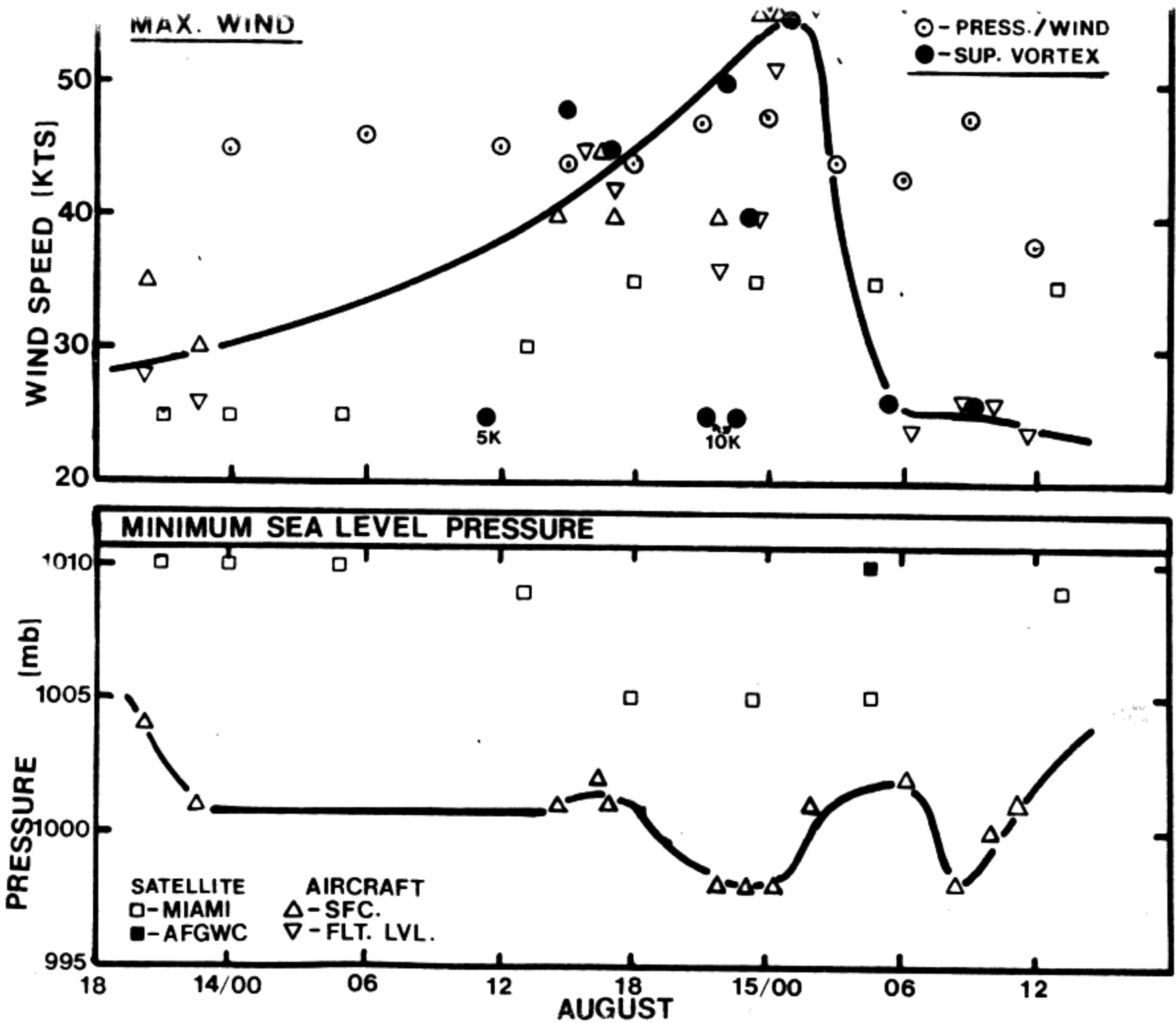


FIGURE 2

TROPICAL STORM EDOUARD

14 SEPT. 1984

1405 - 1655Z

1500 FT

